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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,502	12/31/2003	Nicholas P. R. Hill	59372US002	1812
32692 7590 05/18/2007 3M INNOVATIVE PROPERTIES COMPANY PO BOX 33427 ST. PAUL, MN 55133-3427			EXAMINER NGUYEN, JENNIFER T	
			ART UNIT 2629	PAPER NUMBER
			NOTIFICATION DATE 05/18/2007	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No. 10/750,502	Applicant(s) HILL ET AL.	
	Examiner Jennifer T. Nguyen	Art Unit 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office action is responsive to amendment filed On 02/21/07.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1-2 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 14 and 18 of copending Application No. 10/750,290. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1 and 2 of the instant application correspond to claims 14 and 18 of Application No. 10/750,290, where the limitation of the instant application “the controller configured to compute information related to a touch on the touch plate responsive to sense signals received by the sensors” is equivalent to the limitation “the controller correcting for dispersion in the sensor signals, determining a location of the touch using the dispersion corrected signals, and reconstructing impulses representative of impulses generated by the touch

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to the touch sensitive device” of Application No. 10/750,290. Please note that the limitation of the instant application is broader than the limitation of Application No. 10/750,290.

Instant Application 10/750,502	Application 10/750,290	Application 10/750,290
Claim 1	Claim 14	Claim 18
A touch sensitive apparatus, comprising: a touch plate; a plurality of sensors coupled to the touch plate;	A touch sensitive apparatus, comprising: a touch plate; a plurality of sensors coupled to the touch plate,	
An excitation transducer coupled to the touch plate and configured to induce bending waves in the touch plate;		An excitation transducer coupled to the touch plate and configured to induce bending waves in the touch plate;
A plurality of active buffer circuits, each of the active buffer circuits respectively coupled to one of the sensors; and		A plurality of active buffer circuits, each of the active buffer circuits respectively coupled to one of the sensors; and
A controller coupled to the sensors via the active buffer circuits and to the excitation transducer via a non-actively buffered connection,		A controller coupled to the sensors via the active buffer circuits and to the excitation transducer via a non-actively buffered connection,
<i>The controller configured to compute information related to a touch on the touch plate responsive to sense signals received by the sensors.</i>	<i>The controller correcting for dispersion in the sensor signals, determining a location of the touch using the dispersion corrected signals, and reconstructing impulses representative of impulses generated by the touch to the touch sensitive device</i>	

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-6, 8-14, 16-20, and 25-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hill (Pub. No.: US 2001/0006006) and in view of Paradiso et al. (Pub. No.: US 2003/0217873).

Regarding claim 1, Hill teaches a touch sensitive apparatus (*See figure 6, [0102], lines 1-3*), comprising:

a touch plate (*element 24*);

a plurality of sensors (*element 26; [0102], lines 6-10*) coupled to the touch plate, each of the sensors configured to sense bending waves in the touch plate;

an excitation transducer (*element 31; [0102], lines 4-6*) coupled to the touch plate and configured to induce bending waves in the touch plate;

a controller coupled to the sensors and to the excitation transducers via a non-actively buffered connection (*See figure 8, elements 31, 34, 48, 26, 54*); and the controller (*elements 34, 38, and 54; [0104]; [0105], lines 5-8*) configured to compute information related to a touch on the touch plate responsive to sense signals received by the sensors.

Hill does not specifically teach a plurality of active buffer circuits, each of the active buffer circuits respectively coupled to one of the sensors and the controller coupled to the sensors via the active buffer circuits.

Paradiso teaches a plurality of active buffer circuits (*See figure 4, element 17*), each of the buffer circuits respectively coupled to one of the sensors (*See figure 2, elements 12₁, 12₂, 12₃, 12₄; [0028], lines 2-7*) and a controller coupled to the sensors via the active buffer circuits (*[0029]; elements 16, 18, 20, and 22 comprise a controller*). Therefore, it would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a plurality of active buffer circuits, each of the active buffer circuit respectively coupled to one of the sensors, as taught by Paradiso to the touch sensitive apparatus of Hill resulting in a controller coupled to the sensors via the active buffer circuits so as to increase signal strength and improve the signal-to-noise ratio (*Paradiso: [0028], lines 4-5*).

Regarding claim 2, Hill teaches the information related to the touch comprises touch location (*[0105], lines 5-8*).

Regarding claim 3, Hill teaches the information related to the touch comprises information concerning detection of a lift-off of the touch (*[0083], lines 8-11; [0084], lines 1-7; note that since information related to a touch is alteration of a bending wave by either disturbing the path of bending waves already in the panel or by generating new bending waves, then information concerning lift-off of a touch is equivalent to the panel having normal uninterrupted bending waves or no longer generating bending waves*).

Regarding claim 4, Hill teaches the touch plate is substantially rectangular (*See figure 6*); and the excitation transducer is positioned proximate a peripheral edge of the touch plate (*See figure 1, [0081]*).

Hill does not specifically teach the plurality of sensors comprises four sensors each positioned at a respective corner of the touch plate.

Paradiso teaches a plurality of sensors comprises four sensors each positioned at a respective corner of the touch plate (*See figure 2, elements 12₁, 12₂, 12₃, 12₄*). Paradiso modifies the apparatus of Hill by placing the four sensors at a respective corner of the touch plate such that the excitation transducer is at position equivalent to element 30. It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a plurality of sensors comprise four sensors each positioned at a respective corner of the touch plate, as taught by Paradiso, to the apparatus of Hill PA so as to allow for redundancy and error checking ([0026], lines 6-9).

Regarding claim 5, Hill teaches the plurality of sensors comprises piezoelectric sensors ([0058], lines 4-8).

Regarding claim 6, Hill teaches the excitation transducer comprises a piezoelectric transducer ([0055], lines 1-3).

Regarding claim 8, Hill teaches the plurality of sensors (*Hill [0103], lines 1-3*) and the excitation transducer are respectively disposed on the touch plate, and the plurality of active buffer circuits (*Paradiso: [0026], lines 1-4; [0028], lines 5-7*),

Regarding claim 9, Hill teaches the excitation transducer ([0054], *three terminal devices*) is configured to induce bending waves in the touch plate and to sense bending waves in the touch plate.

Regarding claim 10, the combination of Hill and Paradiso teaches each of the sensors is configured to provide a differential sense signal to a balanced input of one of the active buffer circuits, and each of the active buffer circuits is coupled to a balanced input of the controller (*See figure 4 of Paradiso, note that since the active buffer is referenced to ground a balanced input is*

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provided to the active buffer, resulting in an active buffer circuit that is coupled to a balanced input of the controller).

Regarding claim 11, Hill teaches the sensors (*See figure 6, element 26*) produce bending wave signals responsive to the induced bending waves ([0105], *note that bending wave signals are equivalent to analogue input signals*) but does not mention the controller computes relative dimensions of the touch plate using the bending wave signals.

Paradiso teaches a controller that computes relative dimensions of the touch plate using bending wave signals ([0072]; [0073]; *note that the attenuation of a signal resulting from a touch is a function of the maximum distance between the impact origin and the transducers, which is equivalent to computing relative dimensions of the touch plate*).

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a controller that computes relative dimensions of the touch plate using the bending wave signals, as taught by Paradiso, to the apparatus of Hill so as to provide rapid response time, making it suitable for interactive applications ([0075], *lines 1-2*), improve transducer position optimization, improve impact source identification accuracy, and improve correspondence between impacts and interactive display responses ([0044], *lines 1-5*).

Regarding claim 12, Hill teaches the sensors (*See figure 6, element 26*) produce bending wave signals responsive to the induced bending waves ([0105], *note that bending wave signals are equivalent to analogue input signals*) but does not mention the controller computes absolute dimensions of the touch plate using the bending wave signals.

Paradiso teaches a controller that computes absolute dimensions of the touch plate using the bending wave signals ([0043], lines 10-14; [0072], lines 1-2; note that *a* and *a* second dimension *b* is equivalent to absolute dimensions).

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a controller that computes absolute dimensions of the touch plate using the bending wave signals, as taught by Paradiso, to the apparatus of Hill so as to improve transducer position optimization, improve impact source identification accuracy, and improve correspondence between impacts and interactive display responses ([0044], lines 1-5).

Regarding claim 13, Hill teaches the sensors (*element 26*) produce bending wave signals responsive to the induced bending waves ([0105]; note that the analogue input signals are equivalent to the bending wave signals produced by the sensors); and the controller computes a phase response of each of the sensors using a dispersion relation and a measured phase response ([0107] to [0113]). Hill does not mention the controller computes dimensions of the touch plate using the bending wave signals nor does Hill mention the controller computes a phase response for each of the sensors using computed touch plate dimensions.

Paradiso teaches a controller (*See figure 2, element 22*) that computes dimension of the touch plate using the bending wave signals ([0043]).

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a controller compute dimensions of the touch plate using bending wave signals, as taught by Paradiso, to the apparatus of Hill, resulting in a controller that computes a phase response of each of the sensors using the computed touch plate dimensions, a dispersion relation and a measured phase response so as to improve system operation in the areas

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of transducer position optimization, impact source identification accuracy, impact locating accuracy; and correspondence between impacts and interactive display responses ([0043], lines 1-5).

Regarding claim 14, Hill teaches the excitation transducer induces bending waves in the touch plate in response to a non-audible tone signal ([0041], lines 7-9; [0058], note that active sensing uses ultrasonic frequencies which are equivalent to non-audible tone signals).

Regarding claim 16, Hill teaches the excitation transducer induces bending waves in the touch plate in response to a non-audible multiple tone signal ([0041], lines 7-9; [0058], note that active sensing uses ultrasonic frequencies which are equivalent to non-audible tone signals; [0105], lines 1-2, note that having bending waves (a plural amount) is indicative of having non-audible multiple tone signals).

Regarding claim 17, Hill teaches the multiple tone signals comprises tones having frequencies that are spatially non-periodic ([0124], note that the frequencies are non-periodic when applying the Fourier transform).

Regarding claim 18, Hill teaches the excitation transducer induces a non-audible broadband noise stimulus in the touch plate ([0042], [0046]).

Regarding claim 19, Hill teaches the excitation transducer induces bending waves in the touch plate in response to receiving a swept tone signal from the controller, the sensors producing bending wave signals responsive to the induced bending waves ([0052], note that the swept sine wave is equivalent to a swept tone signal).

Regarding claim 20, Hill teaches the controller comprises a demodulator that demodulates the bending wave signals synchronously with respect to the swept tone signal ([0052], *chirp demodulation circuit*).

Regarding claim 25, Hill teaches the excitation transducer is configured to induce bending waves in the touch plate and to sense bending waves in the touch plate ([0054]; *three terminal devices*).

Hill PA does not mention the controller further comprises wake-up circuitry coupled to the excitation sensor, the wake-up circuitry configured to generate a wake-up signal in response to the excitation sensor sensing a touch to the touch plate and to communicate the wake-up signal to the controller.

Paradiso teaches the controller ([0076], *lines 21-36*; [0077], *lines 1-6*) further comprises wake-up circuitry (*wake-up circuitry is equivalent to circuitry associated with the "range-finding radar"*) coupled to excitation sensors (*See figure 2, elements 12, 30, and 32*), the wake-up circuitry configured to generate a wake-up signal in response to the excitation sensor sensing a touch to the touch plate and to communicate the wake-up signal to the controller. Paradiso modifies the apparatus of Hill by having the controller further comprise wake-up circuitry and having the excitation transducer and sensors of Hill positioned equivalently to that of Paradiso (*Paradiso: See figure 2*).

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have the controller further comprise wake-up circuitry coupled to sensors, the wake-up circuitry configured to generate a wake-up signal in response to the excitation

sensor sensing a touch to the touch plate and to communicate the wake-up signal to the controller, as taught by Paradiso, to the apparatus of Hill, so as to reduce power consumption.

Regarding claim 26, the combination of Hill and Paradiso teaches the active buffer circuits transition from a sleep mode to an operating mode responsive to the controller receiving the wake-up signal (*[0076], lines 26-33; limiting surface impact analysis is equivalent to active buffer circuits in a sleep mode*).

Regarding claim 27, Hill teaches a display coupled to the touch sensitive apparatus (*[0062], lines 1-3*).

Regarding claim 28, Hill teaches a display coupled to the touch sensitive apparatus (*Hill: [0062], lines 1-3*)(*Paradiso: See figure 2*); and a host processor (*Hill: See figure 8, element 34*) (*Paradiso: [0076], lines 3-5*) coupled to the display and the touch sensitive apparatus (*Hill: element 48*).

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hill (Pub. No.: US 2001/0006006) and in view of Paradiso et al. (Pub. No.: US 2003/0217873) and further in view of Bales et al. (Patent No.: US 5,394,003).

Regarding claim 7, the combination of Hill and Paradiso does not specifically teach the active buffer circuits comprises the use of a field effect transistor.

Bales teaches an active buffer circuits comprises the use of a field effect transistor (col. 2, lines 47-55). Therefore, it would have been obvious for a person of ordinary skill in the art at the time the invention was made to have an active buffer circuit comprised of a field effect transistor as taught by Bales in the system of the combination of Hill and Paradiso in order to provide a higher charge detection sensitivity in the touch system.

7. Claims 15, 21-24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hill (Pub. No.: US 2001/0006006) and in view of Paradiso et al. (Pub. No.: US 2003/0217873) and further in view of Sobel (Patent No.: US 6,285,719).

Regarding claims 15, 21, and 23, the combination of Hill and Paradiso teaches an ADC (54, fig. 8) having a sampling frequency and the controller communicating the generated tone signal to the excitation transducer (31) [0104-0105 of Hill].

the combination of Hill and Paradiso does not specifically teaches the excitation transducer induces bending waves in the touch plate having a frequencies greater than half of the sampling frequency of the ADC.

Sobel teaches the excitation transducer induces bending waves in the touch plate having frequencies greater than half of the sampling frequency (col. 2, lines 6-28, col. 6, lines 10-27). Therefore, it would have been obvious for a person of ordinary skill in the art at the time the invention was made to incorporate the frequencies as taught by Sobel in the system of the combination of Hill and Paradiso in order to provide a high resolution measurement.

Regarding claims 22 and 24, the combination of Hill, Paradiso, and Sobel teaches the sensors produce bending wave signals responsive to the induced bending waves having frequencies greater than $f_s/2$; and the ADC registers the bending wave signals as aliased bending wave signals having frequencies lower than $f_s/2$ (col. 6, lines 10-65 of Sobel).

Response to Arguments

8. Applicants' arguments filed 02/21/2007, have been fully considered but they are not persuasive because as follows:

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In response to Applicants' argument stated "Paradiso ... fails to disclose an excitation transducer of any kind". Examiner respectfully disagrees. Paradiso teaches a transducer in SAW touch sensitive device. Applicants' argument stated "The asserted combination clearly fails to provide ... using a non-active buffered connection". However, Hill teaches a controller (34) coupled to the excitation transducer (31) (fig. 8) not via an active buffer. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Hill and Paradiso all teach about SAW sensitive touch with a plurality of sensors and transducers to detect a contact on a contact sensitive touch device. Therefore, applied prior arts are analogous and the combination is proper.

9. Applicant's arguments with respect to claims 7, 15, and 21-24 have been considered but are moot in view of the new ground(s) of rejection.


Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer T. Nguyen whose telephone number is 571-272-7696. The examiner can normally be reached on Mon-Fri: 9:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe can be reached on 571-272-7691. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jennifer T Nguyen
Examiner
Art Unit 2629



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